

Energy Independent Communities: 25x25 Plan Grants Presentation

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City of Whitewater & Whitewater Unified School District

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Overview

What was measured? Why?

Discoveries/Surprises

Total Projects Considered

Pathways to 25 x 25

Projects Selected – Explanation

Potential Renewable Feedstocks

Existing Unknowns: Necessary Information for Future

Action Steps – Immediate & Long - Term

Energy Independence Team Members





City of Whitewater – Population 14,454 (2010)

2005 Signatory of U.S. Mayor's Climate Protection Agreement

2009 El Communities Resolution

Water Star Community (Bronze – July 2010)

DNR Green Tier Legacy Community (investigating)

Whitewater Unified School District – Enrollment 2,033 (2010)





What was measured? Why?

City of Whitewater:

49 Buildings

~ 240,000 square feet

Historic Buildings

Train Depot 1890; White Memorial 1902; Armory 1942

"Middle"

Public Safety Bldg 1967; Wastewater Facility 1982

New-er

Administration Center 1997

Horizon

Innovation Center, 2011; Fire Station, 2012)





What was measured? Why?

Whitewater Unified School District

9 Buildings

High School (1994)

Middle School (1957; 1962, 1965, 1970, 1981, 2000 additions)

Lakeview Elementary (1955; 1956, 1970, 1991, 2000 additions)

Washington Elementary (1966; 2000 addition)

Lincoln Elementary (1952; 1963, 1970, 2000 additions)

Central Office (1974; 1997 addition)

Aquatic Center (2001; 2005 addition)

~ 495,000 square feet

Private Bussing Contract





What was measured? Why?

City of Whitewater:

2009 Energy Use:

3,727,767 kWh

130,989 therms

Whitewater Unified School District

2009 Energy Use*:

3,859,510 kWh

362,798 therms

* Includes Whitewater Aquatic Center (1.3 MWh, 115,000 therms)





Total Projects Considered (a list)

Whitewater University Technology Park & Innovation Center



- Expected to be completed: January 2011
- Supported by \$4.7 million EDA Grant (\$5.4 total cost park)
- 38,000 Square Feet
- CESA 2 first tenant
- "Progressive" Technology Park Covenants





- Whitewater University Technology Park & Innovation Center (cont.)
 - LEED Gold Certification Expected
 - Geothermal HVAC (18,896 therms)
 - 20 kW Solar PV
 - 47.9% of ASHRAE 90.1 Baseline (52.1% more efficient than code)
 - 55% energy demand supplied by on-site renewables
 - Building monitoring; online energy dashboard
 - Low-flow fixtures
 - Graywater collection & reuse
 - Shared parking
 - Low-emission finishes
 - Regional & recycled materials
 - Low-water, native landscaping





- EECBG (City)
 - LED Street / Pedestrian lighting
 - 2 boiler replacement/upgrades
 - VAV & VFD
 - 4 water heater replacements
 - Completed in 2010
 - Save: 136,000 kWh; 11,800 therms
- Admin Center Lighting Reduction (City)
 - Utilized light meters to audit all spaces
 - Removed 55 lighting units, moved others
 - Save: 8,700 kWh /yr; \$2,750 /yr avoided labor





- Misc. Upgrades (City)
 - 3 hot water heater replacements
 - Vending Misers
 - Admin Building VAV
 - Completed in 2010
 - Savings: 8,660 kWh; 800 therms
- Wastewater Treatment Facility (City)
 - \$5.7 million upgrades (2009-2010)
 - Dramatic effluent water quality improvement
 - Energy savings TBD
 - Studied Biogas Collection for Facility Heat
 - Studied Collection of Manure for Digestion





- Comprehensive Lighting Retrofit (District)
 - Completed in 2010
 - Cost: \$ 271,599
 - FoE Incentive: \$ 38,587
 - Savings: \$54,728 (2009 dollars and rates)
 - Payback: 51 months
 - Expected savings: 386,036 kWh / yr
 - Energy Savings: 44.7%
 - Peak Demand Reduction: 117.8 kW





- Complete Facility Audit (District)
 - Boiler Upgrades
 - HVAC
 - Building Controls
 - VFDs
 - Ventilation optimization
 - Vending Miser
 - Minor insulation replacement (caulking, doors)
 - Lighting timers & occupancy sensors
 - Solar hot water
 - Cost (est): \$2,400,000
 - Savings (est): \$269,000 / yr
 - Lifecycle Savings: \$3,570,000
 - Savings (est): 694,835 kWh; 122,139 therms





- Whitewater Aquatic Center
 - 2011 Budgeted Projects:
 - Reprogram Demand Control System (Building Controls)
 - Balance Air Handling Units
 - Vending Miser
 - Replace Weather Stripping Around Doors
 - VFD on Pool Pumps
 - UV Water Treatment
 - Heat Recovery System
 - Annual Savings: 799,444 kWh; 16,627 therms
 - Solar Thermal Pool/Domestic Heating System (2012 Budget)
 - Production (est): 52,903 therms





- Wastewater Treatment Plant Biogas
 - Currently producing ~ 35,000 therms/year (flared)
 - 65,350 therms natural gas demand (2009)
 - Three-phase ramp-up; accepting outside industrial waste
 - Added dual-cycle HVAC (natural gas, biogas) in 2010
 - \$700,000; 6 Year Return on Investment
 - 1 10,000 gal., 13,000 therms (2011)
 - Offset 69 % of natural gas (48,000 therms biogas total)
 - 2 20,000 gal., 13,000 therms (2015)
 - Add industrial waste storage; biogas storage
 - 3 30,000 gal., 13,000 therms (2018)
 - Introduce secondary income stream (industrial waste)





- AMR Smart Water Grid
 - AMR (Automated Meter Reading)
 - Upgrading all water meters in the City to digital
 - "Smart" water grid real time consumption tracking
 - Eliminate need for manual meter reading
- Manure Digester @ Wastewater
 - Study completed in 2010, determined capacity & supply
 - Capacity to accept ~ 840 AU per day
 - Produce 49.5 MMBtu therms biogas / day (200 days/yr)
 - Produce ~ 2,000,000 kWh / yr (microturbine)
 - Time horizon: 2018





- Lincoln Elementary Zero-Net-Energy & Sustainability Magnet
 - Seeking unappropriated State funds (Federal Grant)
 - Educational & Community Sustainability Showcase & Laboratory
 - Integrated Environmental Education in the Classroom
 - Host Community Workshops
 - Energy Efficiency Improvements
 - Geothermal HVAC (18,900 therms)
 - Solar pv & wind turbine (s)





- Renewable Energy Projects to Investigate:
 - Innovation Center
 - 10 kW solar pv tracking
 - Four 20 kW wind turbines
 - Admin Center
 - 13.7 kW solar pv (fixed)
 - 2.96 kW solar pv (tracking)
 - Wastewater Treatment Plant
 - 67.48 kW solar pv (fixed)
 - 29.6 kW solar pv (tracking)
 - Four 20 kW wind turbines





- Renewable Energy Projects to Investigate:
 - High School
 - 20 kW solar pv tracking
 - 30 kW solar pv fixed
 - Four 20 kW wind turbines
 - Middle School
 - 45.58 kW solar pv fixed (2 phases)
 - Central Office
 - 20 kW solar pv fixed
 - Lincoln Elementary
 - 7.77 kW solar pv fixed
 - Washington Elementary
 - 17.7 kW solar pv fixed





Pathways to 25 x 25

- A. Efficiency Projects
 - A. City
 - B. District
 - C. Aquatic Center
- B. RPS 10%
- C. Renewables Underway
 - A. Innovation Center (Geothermal, Solar)
 - B. Wastewater Biogas
 - C. Whitewater Aquatic Center (Solar Thermal)
- D. Future Renewables
 - A. Manure Digester
 - B. Lincoln Elementary Zero-Net-Energy
 - C. Additional Solar & Wind Measures





Pathways to 25 x 25

Economic Development

- Encourage the adoption of energy efficiency, conservation, and renewables in residences and businesses
- Encourage and facilitate medium- and utility-scale renewable energy projects
- Collaborate with Regional and State efforts (Milwaukee 7, etc)

Tools:

- Whitewater University Technology Park
- Community Development Authority
- Education & Outreach
- Partnerships





Pathways to 25 x 25

BASELINE: 90,377 MMBtu

2010 – 2012 Efficiency Projects 23,194 MMBtu (25.7 % reduction)

New Baseline 67,183 MMBtu

• RPS 10% 1,491 MMBtu 2.2 %

Renewables Underway 11,845.8 MMBtu 17.6 % Future Renewables 11,916.9 MMBtu 17.7 %

Total 37.5 %

25.7 % Energy Use Reduction 37.5 % Renewables Utilization 150% 25x25 Goal





Existing Unknowns: Necessary Information for Future

- 1. Utility Cost
- 2. Grant / Incentive Availability
- 3. Private Sector Activity
- 4. Municipal Budget / Economy
- 5. State / Federal / Third-Party Sustainability Communities Programs
- 6. Technology
- 7. Legislation (+/-)
- 8. Partnerships
- 9. Political Will





Action Steps – Immediate & Long – Term

- 1. Immediate
 - Implement Efficiency Projects
 - 2. Implement Renewables Projects
 - a. Wastewater Biogas
 - b. Whitewater Aquatic Center Solar Thermal
 - 3. Develop Vehicle & Transportation Fuels Approach
 - 4. Roll out Education & Outreach programs
 - 5. Investigate Future Renewables
- 2. Long Term (3 5 years)
 - 1. Revisit 25x25 Plan
 - 2. Expand Education & Outreach
 - 3. Investigate Future Renewables





Energy Independence Team Members

Kevin Brunner – City Manager, City of Whitewater

Dr. Suzanne M. Zentner – Administrator, Whitewater Unified School District

Mary Nimm – Community Development Authority Manager – City of Whitewater

Bruce Parker – Director of Neighborhood Services, City of Whitewater

Tim Reel – Wastewater Division Superintendent, City of Whitewater

Jim Strasburg – Director of Business Services, Whitewater Unified School District

Dr. Eric Compass – As. Prof. of Geography, University of Wisconsin – Whitewater

Greg Swanson – Director of Facilities Planning and Management, UW - Whitewater

Vivian Kuss – WE Energies

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Energy Independence Team Members

Special Thanks:

Cameron Clapper – Assistant to the City Manager, City of Whitewater

Thayer Coburn – President, Whitewater Aquatic Center Board of Directors

Nathan Jaeger – 2nd Grade Teacher, Whitewater School District; incoming Director of Business Services (January, 2011)

Connie Lindholm – WE Energies

Paula Malone – Director, Whitewater Aquatic Center

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Additional Comments, Observations, Recommendations

Seek Partnerships

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